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Immunization as a Means of Overcoming Bovine Mastitis

by

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The success of any State-wide plan for dealing with bovine mastitis will depend to a large degree on the willing co-operation of dairy farmers. To obtain this co-operation treatment must be highly efficacious, reasonably cheap and not disturbing to dairying activities. At the present time the method of treatment most in use is irrigation of the mammae of affected animals with or without the simultaneous administration of sulphonamides. In the hands of many practitioners this treatment appears to have given good clinical results, but the temporary improvement gained has not been maintained in some cases. Recurrences are not uncommon, but a worse feature from the point of view of cleaning up the disease is that a proportion of the treated cows retain the causal parasites and remain a menace to others in the herds. In two experimental cases treated by one of us (W.K.) recently, in this manner, one being a subacute case of *str. agalactiae* infection, and the other an acute case of staphylococcal infection, both cleared up clinically following two irrigations with acriflavine and full doses of sulphonamide. Yet both continued to pass the parasites in their milk continually afterwards and both eventually broke down clinically. Similar experiences have come to our notice from other practitioners, and from the literature we conclude that this experience is widespread. In the light of such disappointing results now coming to hand increasingly, it seems to us that this form of treatment cannot be recommended as a highly satisfactory means of dealing with the disease. At best it can only be considered a palliative and one, with its attendant practical difficulties, which will not appeal to stock owners when its shortcomings become known to them.

Just prior to the presest war, one of us (W.K.) in conjunction with Mr. J. N. Peatt, M.R.C.V.S., of Leominster, gave vaccination a fairly extensive trial in a number of herds in Herefordshire with highly satisfactory results as far as protection of in-contacts was concerned. No definite conclusion was reached, however, regarding curative effects in infected animals. Unfortunately the experiment had to be discontinued on the outbreak of war. In 1942, an opportunity arose for an additional experiment in Ireland and this report concerns the record of it. P.D.M., being a resident at the institution where the experimental herd was kept, was in the fortunate position of being able to supervise the experiment in its entirety and to make continuous observations on its progress.

The herd on which the experiment was carried out consisted on the average of 80 cows, 20 of which were pure-bred pedigree stock. It may be objected that the information available as to the conditions prevailing in the herd prior to the inception of the experiment is, at best, fragmentary and by no means as exhaustive as could be desired. This point is readily conceded and is explained by the fact that the adoption of immunisation treatment was prompted by purely economic considerations at short notice when other methods failed. That the outstanding success of the treatment would demand the publication of a detailed record was an eventuality that, at that early stage, was not foreseen. Obviously such an intention would postulate as a preliminary measure closer observation of the conditions obtaining in the herd for a very considerable period previously, as well as the bacteriological examination of the milk of each animal. Fortunately, sufficient reliable information is available to indicate the extent of infection, clinical manifestations, decrease in milk yield, approximate financial loss and other relevant facts prior to the inception of treatment.

Mastitis first became prevalent in the herd during the season of 1940 and for a time its inroads were insidious. It was not until towards the end of 1941 and especially in the spring and early summer of 1942 that the position became so alarming and medicinal treatment so inadequate to cope with it that it was decided to explore the possibilities of immunisation. The figures available for the month of September, 1941, recording nine fresh cases, are fairly representative of its incidence at that period and indicate the futility of relying on medicinal treatment of individual cases and *post-factum* hygiene measures.

CLINICAL SIGNS

The clinical manifestations of the disease call for no specially detailed description and were such as are familiar to every veterinary practitioner. Fresh acute attacks, sometimes recurring at short intervals, causing fibrous deposits replacing destroyed lactiferous tissue, occurred in some cases. Recrudescence of chronic cases resulting in the reappearance of acute symptoms was by no means rare, while in other animals acute attacks subsided without further developments. Generally speaking, infection was of a virulent type which is probably explained by the high incidence of staphylococcal infection. The incidence ratio of the causal bacteria in the samples submitted to bacteriological examination was staphylococci nine, streptococci seven and mixed infection by both these organisms six.

The herd consisted at the outset of the experiment of 19 acute cases, 19 chronic cases and 33 animals clinically free from disease, an incidence ratio of 53·5 per cent. The ages of the animals affected varied from three to 15 years. Six of the animals were heifers in their first lactation. The abnormally large proportion of heifers involved would seem to have some reference to the fact that they were exposed to infection for the first time.

Reliable evidence as to the mode of transmission of infection is not available. Our investigations did not lend any appreciable support to the prevailing tendency to incriminate the milking machine as a prolific disseminator of infection. It must be remarked that the cleanliness of all utensils which obtained on these premises reduces the possibility of infection from this source to a minimum. Hand milking was also employed to some extent and as a routine measure, especially after milking affected animals, the milking cups and the hands of the milkers were immersed periodically in an aqueous solution of chloros (about 1 in 500). As experience had demonstrated that the hands of the milkers, milking machines, etc., are the commonest mode of transmission of infection these must be regarded with suspicion, although our investigations did not produce any positive evidence on which to base a condemnatory opinion.

FINANCIAL LOSSES EXPERIENCED

(*a*) *Through eliminations.*—From January, 1941, to July, 1942, mastitis necessitated the elimination of 18 cows from the herd. A calculation of the financial loss from this source based on a reduction of normal economic utility of these animals at the flat rate of £15 per cow per annum, reveals a deficiency in the neighbourhood of £400 for the period in question.

(*b*) *Decrease in milk and butter yields.*—A decrease in milk yield by the herd occurred during the period of heaviest infection whilst an upward tendency since vaccination confirms the clinical evidence in favour of a successful issue of the treatment. The following figures are self-explanatory in this respect:—

	Pre-vaccination	*Post-vaccination*
Week ending	7/10/1941	6/10/1942
Daily milk yield per animal ...	19·61 lb. ...	21·84 lb.
Week ending	26/5/1942	25/5/1943
Daily milk yield per animal ...	26·65 lb. ...	29·36 lb.

The figures indicating an increase in butter production consequent on vaccination provide even a more striking proof of the benefits of the treatment. Thus for September, 1942, two months after the first vaccination, 570 lb. of butter were produced on the premises compared with 153 lb. for the corresponding month of 1941. The figures for October, 1942, were 600 lb. against 15 lb. for October, 1941. No butter was produced in November, 1941, while 281 lb. were produced in November, 1942. The figures for March of the present year and those for March, 1942, are 420 lb. and 162 lb. respectively, while the corresponding figures for April are 876 lb. and 438 lb. respectively. In May of this year butter production amounted to 1,180 lb. compared with 595 lb. for May of last year (1942).

The apparent discrepancy between the volume of milk yielded and butter manufactured is due to changes in requirements for these products at different periods of the year caused by residence and vacation of some 230 boys at different periods.

The experiment proper commenced with the submission in June, 1942, of milk samples for bacteriological examination. Contrary to expectations the predominating causal organism was a staphylococcus. Of mixed quarter samples submitted from 50 cows, nine contained staphylococci, seven streptococci and six mixed strept.-staph. infection. The remaining 28 were negative. A mixed autogenous vaccine consisting of staphylococcal toxoid and streptococcal anaculture was prepared from these samples. In order to test the harmlessness of vaccine before use, two animals were inoculated with doses of 5 c.c. followed after an interval of

ten days by a further 10 c.c. No untoward results following vaccination of the entire herd with the same doses at the same interval was completed on July 10th, 1942. After vaccination a series of what we consider were allergic shocks developed in some of the inoculated animals. These reactions were usually manifested by a slight inflammation of the mammary gland generally involving an old mastitis lesion, or else by curdled milk, and sometimes by a combination of both. In all cases the symptoms were of a mild nature, rather ill-defined and transient so that they invariably subsided in 24 or, at most, 48 hours. The milk of two animals became blood-tinged within 48 hours of vaccination but resumed its normal appearance within a few days. No systemic disturbance was noted otherwise even in cows advanced in pregnancy. It is significant that in all these "shock" cases subsequent bacteriological examination of the milk established that a curative result had supervened in them.

The ensuing months of August, September and October, which in the previous year had a mastitis incidence of nearly three fresh cases per week, witnessed a remarkable decrease in clinical cases. From early July until mid-November only four fresh cases of mastitis were recorded and the diagnosis was confirmed by bacteriological examination in each case. Three of these were staphylococcal and one streptococcal infection. A marked decrease in severity in these four cases seems to indicate that a not inconsiderable degree of immunity had been established which tempered the virulence of infection. Subsequent to the vaccination, the milk, which had previously been altered in quality as a consequence of chronic mammary infection, displayed a progressive improvement and was soon restored in practically all cases to normal. To this subsidence the increased milk yield with a corresponding increase in butter production is to be ascribed. So great did the increase in the quantity and quality of milk become that the herd gained first place for 1942 in the local Cow-testing Association with an average yield of 650 gallons and a butter-fat average of 233·94 lb. from the 45 cows for which complete records were available.

Commencing about a month after vaccination routine bacteriological examination of individual quarter samples from previously affected animals was carried out. Circumstances did not permit of an examination of milk samples from all cows. The clinical success attending vaccination and the delayed decision to compile a record of the experiment make it a matter for regret that bacteriological examination of the milk of all animals was not undertaken at this time as well as a preliminary measure before vaccination. Of 90 milk samples submitted for bacteriological examination for the period from August 14th to October 23rd, 1942, 53 proved negative, 31 showed a slight and apparently diminishing infection with streptococci and staphylococci, while the presence of an active and abundant infection by the organisms was demonstrated in six cases, four of which developed clinical mastitis. The 31 slightly affected cases provided some interesting features. In some of these samples it was impossible to demonstrate the presence of bacteria either microscopically or culturally although varying amounts of pus cells were evident. In other cases pus cells with ingested bacteria which failed to grow in culture were a feature. These we considered inactive although potentially capable of resuscitation.

A circumstance worthy of note and one which would probably repay further investigation was that inoculation appeared to produce best results when resorted to during late pregnancy, that is, when the animal was "drying off," or during the dry period prior to parturition. In such instances animals previously affected tended to recover more readily in the subsequent lactation period. It was decided to arrange future vaccinations of the herd so that the maximum number of animals might be inoculated under these apparently most favourable conditions.

Early in November, 1942, a scrutiny of the results so far obtained seemed to establish the position at this juncture to be as follows:—

1. That of 33 animals clinically free from mastitis prior to vaccination, four, or 12 per cent., had developed infection. Clinically these four cases were far less virulent than was usual in pre-vaccination cases. Symptoms were less acute and subsided quickly without leaving permanent ill-effects.

2. Bacteriological examination showed that of 19 animals which suffered from acute mastitis prior to vaccination, two still remained slightly affected. (These responded to further vaccine treatment later and although they proved rather obstinate both had completely recovered by May, 1943.)

3. That of 19 animals which suffered from chronic mastitis four remained infected, but some others not yet examined bacteriologically may also have been so.

These results were sufficiently favourable to justify the tentative conclusion that vaccination had been of some value but that further investigations were required before an opinion could be formed as to its true significance in this respect. Modifications of technique, especially with a view to increasing and standardising the potency of the vaccine, required thorough investigation before a full assessment of the value of the vaccine could be reached and employment at its maximum efficiency rendered possible.

The maintenance of herd immunity was the primary consideration in arranging a general vaccination with a more potent vaccine for late December or early in January, 1943. This was deemed desirable because the duration of immunity was uncertain, and in addition the largest possible number of animals could, at this particular period, be vaccinated under what previous experience indicated to be the most suitable circumstances. A not altogether unexpected turn of events in November, 1942, was responsible for the anticipation of this vaccination. Slight mammary inflammation in two animals (Nos. 19 and 53) proved on bacteriological examination to be due to a mixed strept.-staphylococcal infection in one case and to a staphylococcal infection in the other. This was followed in less than three weeks by five other cases of a condition which clinically had to be considered mastitis. An active mixed infection was detected in two of these animals while milk samples from the remaining three showed abundant pus but no living bacteria. These occurrences were understood as indicative of a breakdown of immunity or a diminution of the protection afforded by vaccination. They also showed, *inter alia*, that the value of periodic immersions of the hands and milking cups in a solution of chloros cannot be considered capable of preventing the spread of the disease or as accounting for the improvement obtained.

With a view to restoring immunity, vaccination of the entire herd was resorted to without delay with results that surpassed expectations. The second vaccination was completed on December 23rd, 1942, and as before two doses of vaccine were administered with a ten-day interval. Allergic shock was not so prominent a feature of this vaccination. In fact only two cases were noted, both occurring on the evening of vaccination and consisting in one case of slight inflammation and in the other of slightly clotted milk without any evidence of inflammatory reaction. Both animals were quite normal next morning and remained so. The almost entire absence of allergic shock following this and the subsequent vaccination carried out in April, 1943, seems to be explained by the desensitisation imparted by previous immunisation.

Before proceeding to an investigation of the results of this second inoculation it must be remarked that after this vaccination the inhibitory and correctional value of the treatment was very noticeable. In order to ascertain if such exceptionally successful results were entirely attributable to vaccination one unvaccinated heifer was permitted to join the dairy herd at this juncture as a control. It was not practicable to provide more controls. Two days after parturition this animal developed acute mastitis of a particularly virulent type which terminated in the loss of the quarter involved. Bacteriological examination demonstrated this case to be due to streptococcal infection. Of 55 milk samples submitted for bacteriological examination after the second vaccination, 45 proved to be free from infection. These 45 samples represented 19 clinically free and apparently healthy animals, ten animals which had been rendered free from infection by the first vaccination and 16 animals which had retained infection previous to the second vaccination. Of the ten animals which still harboured infection six were long standing and apparently obstinate cases.

Although there was no evidence of an attenuation or cessation of immunity after this second inoculation, previous experience as well as the desirability of strengthening immunity as much as possible for the approaching summer months counselled a third double-vaccination. This was completed on April 26th, 1943, and a more potent vaccine was employed. Nine out of ten samples submitted for examination a month later proved to be free from infection. With one exception these nine animals had on previous bacteriological examination been infected, although four of them had recovered as a result of an earlier vaccination. A little later, the examination of six milk samples representing the three remaining animals which previous examinations showed to be still affected, and three non-clinical animals, proved the latter to be completely negative both microscopically and culturally. The other three animals still retained a slight but seemingly obstinate infection. At the time of this third vaccination the herd comprised 83 animals. The position in August, 1943, was that four animals still harboured infection.

Summary

The foregoing recital of the benefits of immunisation may be briefly reviewed as follows:—

1. In barely 12 months mastitis was practically eradicated from a heavily infected herd of 80 cows. At least 38 animals were known to be affected at the commencement of the treatment and the number would almost certainly be found to be greater if each animal's milk had been subjected to bacteriological examination. A year later only three animals were known to harbour slight traces of infection.

2. Bacteriological examination of 22 positive cases revealed staphylococci in nine, or 41 per cent., streptococci in seven, or 32 per cent., and mixed staph.-strepts. in six, or 27 per cent.

3. Since November, 1942, four months after immunisation had begun, there has been only one fresh case of mastitis which recovered quickly and completely without any untoward sequel.

4. An unvaccinated heifer, introduced into the herd to ascertain if the apparent immunity was confined to vaccinated animals, developed a virulent type of mastitis two days after parturition which terminated in total loss of the affected quarter.

5. It is estimated that an annual saving of approximately £600 has resulted directly from the beneficial effects of the treatment, whilst the present satisfactory conditions obtaining in the herd are most favourable for the inception of contemplated measures having for their object raising the general standard of the herd and increasing its economic utility.

The Control of Mastitis

G. N. GOULD, M.R.C.V.S.
Southampton

In common with many other veterinary surgeons of my acquaintance, I have from time to time met herds in which *Str. agalactiae* infection has been very prevalent, and in which all the methods of cowshed hygiene commonly advised have proved of little or no avail in controlling the spread of infection. When such instances have occurred, it has been customary to attribute the cause to lack of effort on the part of cowman and milkers or to some slip-up occurring from time to time. A few months ago, however, I came to the conclusion—after experiencing two such breakdowns in herds when I had every reason to place absolute reliance on the herdsman and milkers—that the fault was in the system of application, and that this fault was one that now appears to be a most obvious omission in the accepted methods of mastitis control.

It is agreed that the common method of infection is *via* the teat duct, and that infection can easily be passed from cow to cow by the milkers' hands, teat cups, etc. The common systems of cowshed hygiene advised provide for the cleansing of the udder and teats before milking, the use of hypochlorite antiseptic solution before milking, and the dipping of the teat cups in water followed by dipping in hypochlorite solution where machine milking is used.

The cows are then milked by hand or machine and then stripped. In probably more than 90 per cent. of herds the teats are left in a wet condition, with a thin coating of milk over them—an ideal medium for bacterial growth. The cow is turned out and is brought in for milking again after an interval of 8 to 16 hours, depending upon whether the next milking is morning or afternoon.

It would appear that the system of cowshed hygiene in vogue is an adaptation of a system designed to produce clean milk rather than a system to control contagious mastitis. *Failure to cleanse the teats with a hypochlorite antiseptic after milking is an obvious omission.*

Since instituting such a system in mastitis herds the degree of control achieved has shown remarkably encouraging results—so much so that I have made it a routine in all herds. I have come to the conclusion that it must be an essential feature of cowshed hygiene and that it is a far more important factor from the point of view of mastitis control than cleansing the teats prior to milking.

I hold the opinion that the teats of the cow should be left as dry as possible after milking, and although it is common to try and insist on dry milkers, few if any of us can claim to meet many from day to day.

The cleansing of the teats after milking, using a hypochlorite solution and leaving them as dry as possible, is in my opinion a most important factor in mastitis control and should be an integral part of cowshed hygiene in all herds.

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net	Post free
	s. d.	s. d.
Statutory Rules and Orders, 1943:		
1645. Milk and Dairies, England and Wales. Milk (Special Designations) Regulations, November 18th	0 1	0 2
Health, Ministry of:		
Circular 2879. Milk (Special Designations) Regulations, 1936-43. Veterinary Examination of Accredited Milk Herds. November 29th, 1943	0 1	0 2

CLINICAL COMMUNICATION

Br. abortus Infection in the Horse*

W. R. McKINNA, M.R.C.V.S., D.V.S.M. (VICT.)
Huddersfield

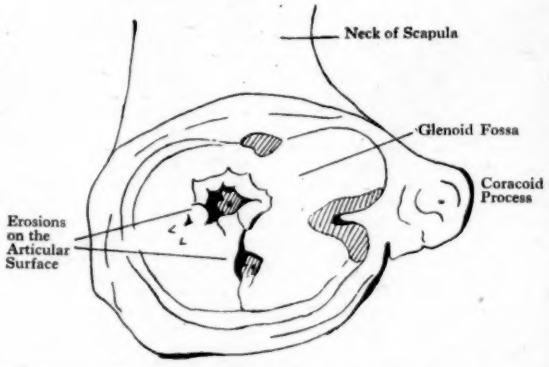
Subject.—Chestnut cart gelding; six years old; purchased from a farm for work in the town in September, 1942. The horse worked satisfactorily until February, 1943, when it fell slightly lame. Bruising of the foot was diagnosed and in a week the horse was about to be re-shod, when it became acutely lame. After some days, an obvious shoulder lameness was presented with swinging gait of the off fore limb and a slight swelling just below and to the outer side of the point of the shoulder. This swelling persisted and showed no pus on exploratory punctures.

Mild local treatment was followed by blistering the affected area on two occasions with no result.

In the middle of April, a fluctuating swelling appeared on the near side withers—the opposite side to the lame limb. Here appeared a solution of the cause of the lameness, and a blood sample revealed an agglutination titre of 1 in 80 against *Br. abortus*. It seemed a reasonable assumption that the acute shoulder lameness was in the nature of an arthritis of the shoulder joint.

Treatment now turned to the use of dead abortus vaccine. The bovine strain was used at first and after the second injection a dramatic improvement in the degree of lameness occurred. The local reaction with abscess formation was so marked, however, that a request was made to the Laboratory of the Ministry of Agriculture for their dead abortus vaccine, equine strain. A course of three injections was given at ten-day intervals, but the local reactions proved as severe as before, as I was warned would be the case.

Articular Lesions in Scapula



The withers swelling was not interfered with and subsided slightly. The horse was now only slightly lame.

In July, lameness became slightly more pronounced and a further course of three vaccine injections was given.

At the end of August, the horse was almost sound and was shod preparatory to light work. Within a few days, however, lameness recurred along with a fistulous withers swelling now on the same side as the affected limb. A period of rest brought about no improvement, and it was decided that it was improbable that the horse would ever become workably sound. He was destroyed on October 5th.

A *post-mortem* examination was made of the affected limb and withers. The withers swellings contained a yellowish purulent material, the abscess cavities extending deeply downwards. At the level of the shoulder joint and on its inner side an encapsulated abscess the size of an orange was found. Exposure of the joint surfaces showed on the articular cartilage of the scapula deep erosions into the cartilage and necrosis around part of the rim of the joint.

The surface of the humerus was normal.

The lesions of the articular cartilage were obviously old standing, and it is remarkable that the horse ever approached any degree of soundness.

It was not possible to obtain a photograph of the joint condition, but the accompanying sketch indicates the position of the lesions and their depth.

* Presented to the Yorkshire Division, N.V.M.A., at Leeds, November 22nd, 1943.

ABSTRACTS

[Initiation and Maintenance of Lactation in Dairy Heifers by Hormone Administration. Reece, R. P. (1943.) *Proc. Soc. Exp. Biol. Med., N.Y.* **52**. 145-146.]

Details are given of the successful initiation and maintenance of lactation in two nulliparous heifers by the subcutaneous injection of stilboestrol over periods of eleven and 13 weeks respectively. Dosage consisted of 5 mg. diethylstilboestrol dipropionate twice weekly for six and five weeks; in the following five and eight weeks the dose injected was progressively increased from 7 mg. twice weekly to 20 mg. twice weekly. The total amounts of stilboestrol used in the two heifers were 163 mg. and 268 mg. respectively; in the heifer receiving the smaller amount, 5 mg. of testosterone dipropionate was also injected twice weekly for the first six weeks. During the injection periods there was some increase in udder and teat size, but there was no distension of the udder with secretion.

Milking was commenced at or shortly after the cessation of the injections, when the secretion was similar to colostrum. Following this, both heifers suckled calves for a time. Approximately four and five months after the commencement of stilboestrol administration both heifers appeared to be in full milk flow. The peak daily milk production in one heifer was 27·5 lb. and in the other 33·7 lb. One heifer conceived to service after the stilboestrol administration had stopped. The dioestrous cycle in the other heifer was irregular, and she was subsequently shown to have developed a cyst in one ovary.

This report confirms the previous work of British authors (Folley *et alia,* 1940, 1941), that the subcutaneous injection of diethylstilboestrol dipropionate will stimulate udder and teat growth and initiate and maintain lactation in nulliparous dairy heifers. The present author suggests that suckling a calf may aid in bringing about full lactation in heifers prepared for lactation by hormone administration.

N. J. S.

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[Submucous Resection: Surgical Correction of Prolapse of the Rectum. Johnson, H. W. (1943.) *J. Amer. vet. med. Ass.* **102**. 113-115 (6 figs.).]

A plastic operation is performed for the correction of irreducible rectal prolapse in the bovine. The operation consists of the removal of a collar of congested and oedematous mucosa to permit reduction of the prolapsed portion of the bowel. In technique and effect it bears close similarity to Vennerholm's operation for the correction of paraphimosis in the horse.

Under epidural anaesthesia the first step is to apply traction on the prolapse and transfix the rectum by two 8-inch needles, crucially placed, to prevent its return before completion of the operation. A longitudinal incision is now made on the dorsal aspect of the prolapse, extending throughout its length and penetrating the mucosa only. Two circular incisions connecting up with the first incision are made at the anal rim and the apex of the prolapse respectively. By blunt dissection the mucosa is removed from the prolapsed portion and after attending to bleeding points the two circular incisions are united by a series of continuous sutures. The removal of this collar of mucous membrane is carried out in stages, a portion being dissected and sutured before further dissection is undertaken. After removal of the transfixing needles the prolapse is returned and a purse string suture inserted at the anal rim to prevent recurrence.

The author claims amongst other things that, since there is no interference with the serous coat, peritonitis and pararectal abscess cannot arise as might be the case with amputation. The operation technique is well explained diagrammatically.

C. F.

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[The Minimum Dose of Phenothiazine Required to Remove 100 per cent. of *Haemonchus contortus* from Sheep. Gordon, H. McL. (1943.) *Austral. Vet. J.* **19**. 29-30.]

Gordon notes that most workers who have tested phenothiazine as an anthelmintic for sheep have recorded its high degree of efficiency against *H. contortus* and that there is little doubt that the full dose, 20 to 25 grammes for a grown sheep, will always remove all the adult females of this parasite. He adds that such a large dose is expensive, costing about 4d. per sheep at the present price of phenothiazine in Australia, and that if a smaller dose serves the same purpose the drug can be used more widely. Results from a limited number of experiments show that doses exceeding 6 grammes for sheep of about 30 kg. body weight will almost invariably remove all *H. contortus* females. For older, heavier sheep a dose of 10 grammes, or half that necessary to obtain high degrees of efficiency against *Oesophagostomum columbianum* and *Trichostrongylus* spp., is likely to remove all the female *H. contortus* from the vast majority of, if not all, sheep.

J. N. O.

[Experimental Nicotinic Acid Deficiency in the Adult Silver Fox. Hodson, A. Z., and Loosli, J. K. (1942.) *Vet. Med.* **37**. 470-473.]

A deficiency disease was set up in six adult male foxes and four speyed vixen by feeding them on a modified Goldgerger (*i.e.,* a high-maize, pellagra- or blacktongue-producing) diet. The earliest indication of deficiency was a positive benzidine test for faecal blood, which was applicable in view of the fact that no meat was being fed. This was followed by the development of inflammatory pus-filled areas in the cheek and around the teeth; tongue lesions (as in "canine blacktongue") were not common. Refusal of food, gastrointestinal haemorrhage and collapse followed in untreated animals, although five animals made complete recoveries when given nicotinic acid by mouth before collapse supervened. Treatment following collapse was ineffective.

Treatment with vitamins B_1, B_6 and calcium pantothenate did not exert any effect upon lesions, but there was evidence from body weight curves that these factors were not present in optimal amounts in the basal diet.

Full pathological details are not given.

A. N. W.

REVIEW

[Animal Nutrition and Veterinary Dietetics. Second Edition: R. G. Linton and G. Williamson. W. Green & Son, Ltd., 2 and 4, St. Giles Street, Edinburgh. Price 35s. net.]

The initial satisfaction of first handling this book gives way to a mingled sense of disappointment and aggravation. Scientific information, more than ever in demand, continues to be cloaked in gorgeous raiment. Though print and plate undoubtedly benefit by good paper and wide spacing the high cost immediately sets a premium on knowledge and will undoubtedly tend to limit circulation.

The slight rearrangement as compared with the first edition is all to the good, as is the great extension of certain sections such as that relating to minerals and their role in nutrition, and the feeding of livestock. The compilation of a book of this nature, the material of which is largely drawn from or based on the literature, must be made most difficult by the spate of scientific works. The authors have, however, brought this second edition remarkably well up to date and any criticism with regard to deficiency in this respect must, in all fairness, be attributed to the difficulty of selection when catering for a wide field of readers. Of the wealth of material presented that relating to the storage of foodstuffs should have a special appeal at the present time and the sections relating to the detailed feeding of different domestic animals as well as poultry, dogs and rabbits are of special value. One wonders, however, why the goat was overlooked.

The book concludes with a most helpful appendix comprising a table of vitamin contents of various foods and their composition and nutritive values. Although probably of most value to the undergraduate, this book should have a wide appeal to farmers as well as to veterinary surgeons, enabling them to keep well abreast of modern trends in nutrition.

Weekly Wisdom

Later generations would come to think of Pasteur as he was when he was 60, *half paralysed, bearded and grave, and too easily they would forget that he was ever a young man, whose genius it was to perceive in the minute the signature of the universal. Behind his finely disciplined intellect, and the beautiful exactitude of his researches, there was an imagination very youthful, very daring, very light and free.*—E. C. Large, "The Advance of the Fungi."

* * * * *

The Ministry of Health have advised local authorities that the Medical Personnel (Priority) Committee consider that the need of the Forces for doctors is immediate and that acceleration of recruitment in the near future cannot be avoided. Certain doctors, therefore, holding posts at hospitals are to be recruited forthwith.

* * * * *

Our great national shows will be a more important shop window to the world than ever they were before. It will not be a fancier's animal that the world's breeders will be looking for. Type will, of course, count, as it always must, but we shall probably find that, whatever judges of the respective breeds may say, potential buyers may be inclined to put less emphasis on trivial faults in horn, nose, tail setting, for example, in the dairy breeds and to put greater reliance upon proved or probable prepotency and production.—*Farmer and Stock-Breeder,*

IN PARLIAMENT

Demand for State Furtherance of Scientific Endeavour

The following Motion, of which early last week over 200 M.P.s already had notified their support, has been tabled by The Parliamentary and Scientific Committee and is now on the order papers of the House of Commons:—

"That this House, recognising that if the United Kingdom is to maintain its position in the post-war world and carry out effective plans for physical reconstruction and social betterment, research and the application of scientific knowledge in all fields must be promoted on a far bolder scale than in the period 1919-1939, urges H.M. Government forthwith:—

(i) To assure the universities that in planning future developments for research, teaching and higher learning as a whole they will receive support from the State on a much larger scale than hitherto.

(ii) To arrange that education and training in schools, technical colleges and universities shall be directed at the earliest date towards providing a far greater number of persons highly trained in science and technology.

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ABSTRACTS

[Initiation and Maintenance of Lactation in Dairy Heifers by Hormone Administration. Reece, R. P. (1943.) *Proc. Soc. Exp. Biol. Med., N.Y.* **52**. 145-146.]

Details are given of the successful initiation and maintenance of lactation in two nulliparous heifers by the subcutaneous injection of stilboestrol over periods of eleven and 13 weeks respectively. Dosage consisted of 5 mg. diethylstilboestrol dipropionate twice weekly for six and five weeks; in the following five and eight weeks the dose injected was progressively increased from 7 mg. twice weekly to 20 mg. twice weekly. The total amounts of stilboestrol used in the two heifers were 163 mg. and 268 mg. respectively; in the heifer receiving the smaller amount, 5 mg. of testosterone dipropionate was also injected twice weekly for the first six weeks. During the injection periods there was some increase in udder and teat size, but there was no distension of the udder with secretion.

Milking was commenced at or shortly after the cessation of the injections, when the secretion was similar to colostrum. Following this, both heifers suckled calves for a time. Approximately four and five months after the commencement of stilboestrol administration both heifers appeared to be in full milk flow. The peak daily milk production in one heifer was 27·5 lb. and in the other 33·7 lb. One heifer conceived to service after the stilboestrol administration had stopped. The dioestrous cycle in the other heifer was irregular, and she was subsequently shown to have developed a cyst in one ovary.

This report confirms the previous work of British authors (Folley *et alia*, 1940, 1941), that the subcutaneous injection of diethylstilboestrol dipropionate will stimulate udder and teat growth and initiate and maintain lactation in nulliparous dairy heifers. The present author suggests that suckling a calf may aid in bringing about full lactation in heifers prepared for lactation by hormone administration.

N. J. S.

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[Submucous Resection: Surgical Correction of Prolapse of the Rectum. Johnson, H. W. (1943.) *J. Amer. vet. med. Ass.* **102**. 113-115 (6 figs.).]

A plastic operation is performed for the correction of irreducible rectal prolapse in the bovine. The operation consists of the removal of a collar of congested and oedematous mucosa to permit reduction of the prolapsed portion of the bowel. In technique and effect it bears close similarity to Vennerholm's operation for the correction of paraphimosis in the horse.

Under epidural anaesthesia the first step is to apply traction on the prolapse and transfix the rectum by two 8-inch needles, crucially placed, to prevent its return before completion of the operation. A longitudinal incision is now made on the dorsal aspect of the prolapse, extending throughout its length and penetrating the mucosa only. Two circular incisions connecting up with the first incision are made at the anal rim and the apex of the prolapse respectively. By blunt dissection the mucosa is removed from the prolapsed portion and after attending to bleeding points the two circular incisions are united by a series of continuous sutures. The removal of this collar of mucous membrane is carried out in stages, a portion being dissected and sutured before further dissection is undertaken. After removal of the transfixing needles the prolapse is returned and a purse string suture inserted at the anal rim to prevent recurrence.

The author claims amongst other things that, since there is no interference with the serous coat, peritonitis and pararectal abscess cannot arise as might be the case with amputation. The operation technique is well explained diagrammatically.

C. F.

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[The Minimum Dose of Phenothiazine Required to Remove 100 per cent. of *Haemonchus contortus* from Sheep. Gordon, H. McL. (1943.) *Austral. Vet. J.* **19**. 29-30.]

Gordon notes that most workers who have tested phenothiazine as an anthelmintic for sheep have recorded its high degree of efficiency against *H. contortus* and that there is little doubt that the full dose, 20 to 25 grammes for a grown sheep, will always remove all the adult females of this parasite. He adds that such a large dose is expensive, costing about 4d. per sheep at the present price of phenothiazine in Australia, and that if a smaller dose serves the same purpose the drug can be used more widely. Results from a limited number of experiments show that doses exceeding 6 grammes for sheep of about 30 kg. body weight will almost invariably remove all *H. contortus* females. For older, heavier sheep a dose of 10 grammes, or half that necessary to obtain high degrees of efficiency against *Oesophagostomum columbianum* and *Trichostrongylus* spp., is likely to remove all the female *H. contortus* from the vast majority of, if not all, sheep.

J. N. O.

[Experimental Nicotinic Acid Deficiency in the Adult Silver Fox. Hodson, A. Z., and Loosli, J. K. (1942.) *Vet. Med.* **37**. 470-473.]

A deficiency disease was set up in six adult male foxes and four speyed vixen by feeding them on a modified Goldgerger (*i.e.*, a high-maize, pellagra- or blacktongue-producing) diet. The earliest indication of deficiency was a positive benzidine test for faecal blood, which was applicable in view of the fact that no meat was being fed. This was followed by the development of inflammatory pus-filled areas in the cheek and around the teeth; tongue lesions (as in "canine blacktongue") were not common. Refusal of food, gastrointestinal haemorrhage and collapse followed in untreated animals, although five animals made complete recoveries when given nicotinic acid by mouth before collapse supervened. Treatment following collapse was ineffective.

Treatment with vitamins B_1, B_6 and calcium pantothenate did not exert any effect upon lesions, but there was evidence from body weight curves that these factors were not present in optimal amounts in the basal diet.

Full pathological details are not given.

A. N. W.

REVIEW

[Animal Nutrition and Veterinary Dietetics. Second Edition: R. G. Linton and G. Williamson. W. Green & Son, Ltd., 2 and 4, St. Giles Street, Edinburgh. Price 35s. net.]

The initial satisfaction of first handling this book gives way to a mingled sense of disappointment and aggravation. Scientific information, more than ever in demand, continues to be cloaked in gorgeous raiment. Though print and plate undoubtedly benefit by good paper and wide spacing the high cost immediately sets a premium on knowledge and will undoubtedly tend to limit circulation.

The slight rearrangement as compared with the first edition is all to the good, as is the great extension of certain sections such as that relating to minerals and their role in nutrition, and the feeding of livestock. The compilation of a book of this nature, the material of which is largely drawn from or based on the literature, must be made most difficult by the spate of scientific works. The authors have, however, brought this second edition remarkably well up to date and any criticism with regard to deficiency in this respect must, in all fairness, be attributed to the difficulty of selection when catering for a wide field of readers. Of the wealth of material presented that relating to the storage of foodstuffs should have a special appeal at the present time and the sections relating to the detailed feeding of different domestic animals as well as poultry, dogs and rabbits are of special value. One wonders, however, why the goat was overlooked.

The book concludes with a most helpful appendix comprising a table of vitamin contents of various foods and their composition and nutritive values. Although probably of most value to the undergraduate, this book should have a wide appeal to farmers as well as to veterinary surgeons, enabling them to keep well abreast of modern trends in nutrition.

Weekly Wisdom

Later generations would come to think of Pasteur as he was when he was 60, *half paralysed, bearded and grave, and too easily they would forget that he was ever a young man, whose genius it was to perceive in the minute the signature of the universal. Behind his finely disciplined intellect, and the beautiful exactitude of his researches, there was an imagination very youthful, very daring, very light and free.*—E. C. Large, "The Advance of the Fungi."

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The Ministry of Health have advised local authorities that the Medical Personnel (Priority) Committee consider that the need of the Forces for doctors is immediate and that acceleration of recruitment in the near future cannot be avoided. Certain doctors, therefore, holding posts at hospitals are to be recruited forthwith.

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Our great national shows will be a more important shop window to the world than ever they were before. It will not be a fancier's animal that the world's breeders will be looking for. Type will, of course, count, as it always must, but we shall probably find that, whatever judges of the respective breeds may say, potential buyers may be inclined to put less emphasis on trivial faults in horn, nose, tail setting, for example, in the dairy breeds and to put greater reliance upon proved or probable prepotency and production.—*Farmer and Stock-Breeder*.

IN PARLIAMENT

Demand for State Furtherance of Scientific Endeavour

The following Motion, of which early last week over 200 M.P.s already had notified their support, has been tabled by The Parliamentary and Scientific Committee and is now on the order papers of the House of Commons:—

"That this House, recognising that if the United Kingdom is to maintain its position in the post-war world and carry out effective plans for physical reconstruction and social betterment, research and the application of scientific knowledge in all fields must be promoted on a far bolder scale than in the period 1919-1939, urges H.M. Government forthwith:—

(i) To assure the universities that in planning future developments for research, teaching and higher learning as a whole they will receive support from the State on a much larger scale than hitherto.

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NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 22nd.—Meeting of the Ayrshire Division, N.V.M.A., at the Hannah Dairy Research Institute, Ayr, 2 p.m.

Dec. 23rd.—Annual Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries, 12 noon.

Jan. 5th, 1944.—R.C.V.S. Committee Meetings.

Jan. 6th.—**R.C.V.S. Council Meeting.**

Jan. 7th.—Meeting of the Sussex Division, N.V.M.A., at Brighton, 2.15 p.m.

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"The Veterinary Record" and Changes of Address

The attention of all our readers is drawn to the important new announcement regarding the above now receiving publication in our Notices Column.

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PETROL RATIONING

Intimation has been received from the Petroleum Division of the Ministry of Fuel and Power that petrol rationing in respect of private cars has now been placed, until further notice, upon the basis of a four months', instead of a three months', rationing period. In the case of veterinary surgeons the next rationing period will cover the four months of February, March, April and May, 1944. In the course of a letter which will accompany the issue of coupons in January, notification is given of another important change in that the recipient of an allowance of petrol is now himself required to enter, or have entered, upon each coupon before tendering it to a supplier, the registration number of the vehicle specified in the application in response to which these coupons have been issued, which number the regional petroleum offices have been responsible for entering hitherto.

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R.C.V.S. OBITUARY

Lazenby, John William, Capt., late R.A.V.C., Arden Lea, Tadcaster, Yorks. Graduated Edinburgh, May 22nd, 1894. Died November 26th, 1943; aged 70 years.

Lee, George William, D.S.O., V.D., T. Lt.-Col. S.A.V.C., Halkfeld, Otjiwarongo, South-West Africa. Graduated Edinburgh, December 20th, 1893. Died 1943.

Col. George William Lee, D.S.O., V.D., M.R.C.V.S.

We learn with regret, from the current issue of *The Journal of the South African Veterinary Medical Association*, of the death of Colonel George W. Lee, whose career, as recounted by "H.H.C." in that journal, is well worthy of record in our columns.

Colonel Lee (he writes) first came to South Africa as a member of the 2nd English rugby team in 1896 and thereafter took part in the Mashona Rebellion of the same year. On the outbreak of the rinderpest he proceeded to the Victoria Compound, Kimberley, early in 1897 in order to study rinderpest immunisation under Professor Koch. He then returned to Salisbury, together with C. E. Gray, Osborne and A. Neill, all of whom had received appointments under the Chartered Company. In 1898 he joined the Southern Rhodesian Volunteers and on the outbreak of the Boer War was appointed Veterinary Officer to the transport of the Rhodesian Field Force under General Carrington. On the disbandment of this Force in September, 1900, he returned to civil duty for a short time.

From the end of 1900 until the termination of hostilities, Lee was a member of Kitchener's Fighting Scouts under Colonel Colenbrander. Later he was attached to the Right Wing and W. C. Lowe (formerly of the Cape C.V.D.) to the Left Wing. For his services in this campaign he received the Queen's and King's medals with six bars. He left the Southern Rhodesian Service in 1902. He then received an appointment in the Transvaal Repatriation Department and later (as from September 30th, 1903) entered the C.V.D. For six months (1904-05) Lee was sent on special duty to the Bechuanaland Protectorate in view of the spread of East Coast fever in adjoining territories. On the outbreak of the Great War, he proceeded on active service with the S.A.V.C. to German South West Africa, and ended up as A.D.V.S.

During the military occupation of South West Africa (1915-1919) Protectorate, Lee was appointed Director of Agriculture and with a small staff of veterinary officers was kept busy controlling epizoötics such as glanders, anthrax, scab, etc. In 1920, when a civil administration was established, Lee resigned from the service and took up ranching in South-West Africa in which venture he was eminently successful.

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Capt. J. W. Lazenby, M.R.C.V.S.

Mr. Lazenby had practised as a veterinary surgeon in the Tadcaster and Boston Spa district for over 45 years, and was well known to a wide circle of friends in both the East and West Riding. He served in France from 1915 to 1917 as Captain in the R.A.V.C. For a number of years he had been a Governor of the Tadcaster Grammar School. He was a Past Master of the Calcaria Lodge of Freemasons and a P.Prov. Assistant Grand Standard Bearer. Mr. Lazenby is survived by a widow, two daughters and a son, to whom deep sympathy is extended in their bereavement.

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The Late Capt. G. Dunlop Martin, M.R.C.V.S.

Personal Tribute

Capt. Scott Dunn writes:—

The news of George Dunlop Martin's death came as a great shock to me. When a few weeks ago I said good-bye to him at the Conway Hall, little did I think that would be the last time I should see him. My friendship with him dated from the last war when we served together in the A.V.C.

During my year of office with the "Central" he was a great help to me as a member of the Council and I valued his opinion immensely. He was a regular attender at all Council and general meetings and always contributed something useful in the way of *post-mortem* specimens and case records.

With his old world courtesy and his quiet unobtrusive manner he was extremely popular, and it is my great personal regret that he did not live to receive the "Victory" medal which he so richly deserved. I trust when next I meet my colleagues of the "Central" that something will be done to perpetuate his memory.

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We regret the omission from the account of the funeral of Mr. G. H. Livesey, appearing in our last issue, of reference to the attendance of Miss M. Bentley, who represented the Society of Women Veterinary Surgeons.

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PERSONAL

Forthcoming Marriage.—Daniel—Rust.—The engagement is announced between Walter John Daniel, of Deepdene, Pontypool, Mon, and Brenda Borland Rust, M.R.C.V.S., of Bank House, Billericay, Essex.

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Marriage.—Lewis—Woolley.—At St. Mary's Church, Kabete, Nairobi, Kenya, on August 10th, 1943, Roy William Lewis, M.R.C.V.S., to Rita Mary Woolley, only daughter of Mr. and Mrs. H. G. Woolley, of Sidcup, Kent.

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UNIVERSITIES AND POST-WAR RESEARCH

In our Parliamentary column this week we record the Notice of Motion, widely supported by M.P.s, in which a demand is made for furtherance of scientific endeavour by the State. Another important event organised by the Parliamentary and Scientific Committee is the reception of a deputation from the Committee to discuss the Committee's report on universities and post-war research.

This deputation, consisting of M.P.s, Peers and scientists, attended at the House of Commons on Wednesday last and was received by the Lord Privy Seal together with five other Ministers.

The Committee's case was put by ten speakers, among whom was Dr. W. R. Wooldridge, who advanced a plea for improved facilities for agricultural, medical and veterinary research.

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ROYAL ARMY VETERINARY CORPS

The following announcements are made in the issue of *The London Gazette* dated November 30th, 1943: To be Lts.—Alexander Henry Laing (297092), October 11th, 1943; Oliver Yates Mayor (297464), October 21st, 1943; Ian Spalding McLaren (297769), Gordon Thomas Williamson (297187), October 25th, 1943; John Colley Wilson (297188), October 26th, 1943; David Wood MacDonald (297183), October 27th, 1943; Stuart Harvey Thompson (297186), October 28th, 1943; Francis Brendan Halpin (297182), Alexander MacInnes MacLeod (297770), November 1st, 1943.